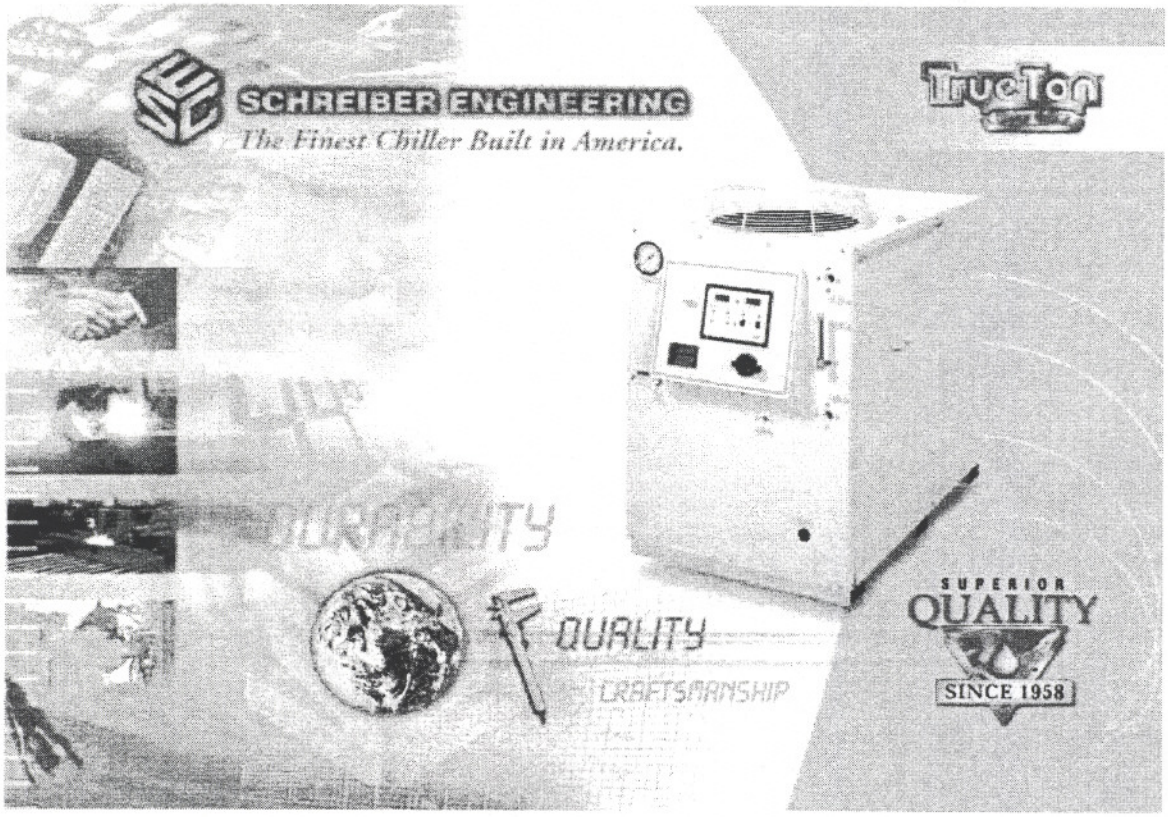
INSTALLATION, OPERATION & MAINTENANCE

OWNERS MANUAL



Model:	**MICRO MAX ¾, 1 AND 1-1/2 TON**
Serial No.:	
Voltage:	**230/1**
Ref. Charge:	**R134A**

SCHREIBER ENGINEERING

a Division of DovaTech

12111 E. Park Street, Cerritos, CA 90703

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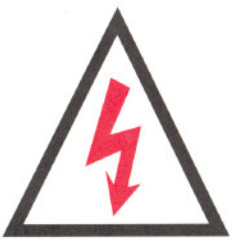
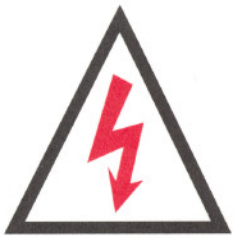


WARNING



ELECTRICAL HAZARDS

1) TURN OFF MAIN POWER DISCONNECT SWITCH ON THIS MACHINE BEFORE ATTEMPTING TO SERVICE THIS EQUIPMENT.

2) THIS MACHINE IS PORTABLE. DISCONNECT ALL POWER SOURCES BEFORE REMOVING CONTROL COVERS.

3) USER IS RESPONSIBLE FOR LOSS OF (OR FAILURE TO USE AND MAINTAIN) ANTI-HAZARD PROTECTIVE COVERS FOR ELECTRICAL EQUIPMENT AS FURNISHED BY THE MANUFACTURER OF THIS MACHINE.

4) SHOULD YOU FIND IT NECESSARY TO MAKE ANY REPAIRS TO THE REFRIGERATION, BECAUSE REPAIR CAN BE HAZARDOUS, READ THE UNIT MANUAL UNDER REFRIGERATION, OR CALL THE MANUFACTURER AND SELLER. PLEASE NOTE THE DANGER OF OVER CHARGING THE REFRIGERATION SYSTEM.

Failure to read and observe above precautionary warnings are serious offenses under Public Law 91-596. All employees are hereby notified that the employer (and owner of this equipment) under OSHA must take immediate disciplinary action up to and including dismissal for failure to read and comply with this notice.

To Comply With OSHA, All Warning Signs Must Not Be Removed From This

Water Chilling Equipment

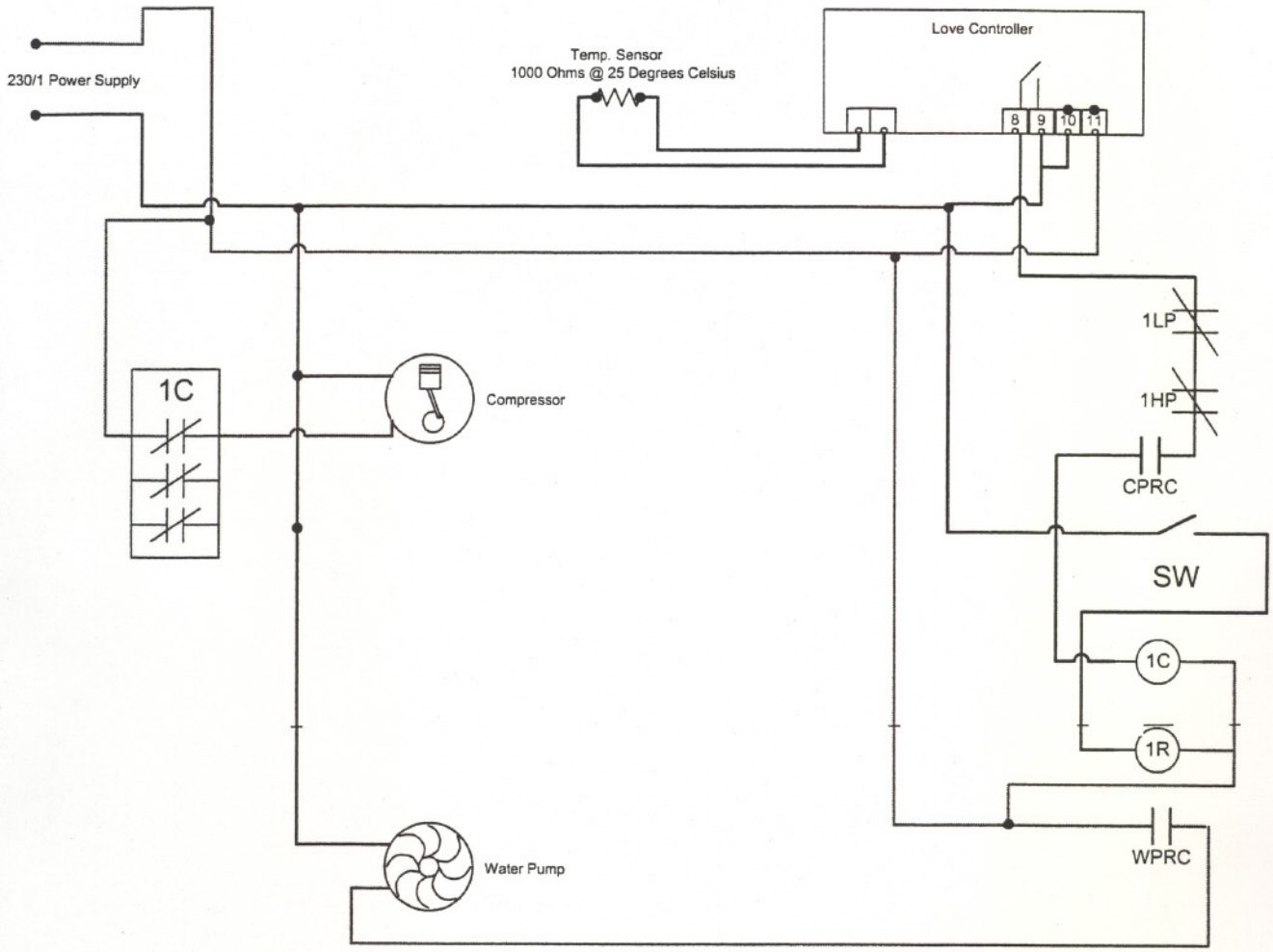
Specifications:

GENERAL	
Max rated ambient temp.	90 °F
Min. Chilled water temp.	60 °F
Max Water Temp.	85 °F
REFRIGERATION	
Refrigerant	R134A
Charge	3 lbs.
Compressor HP	1 HP
ELECTRICAL	
Voltage	230/1
Full Load Amps	13.8 AMPS
PUMP	
Pump Specifications:	5.5 g.p.m. @ 60 p.s.i.
Nominal Flow Rate	4.0 g.p.m.
Nominal Pressure	60 p.s.i.
Pump Horsepower	½
Pump Type	Positive Displacement
Pump Material	Brass
PHYSICAL	
Overall Dimensions	21.500Wx 26.500Dx30.750H
Reservoir Capacity	8 Gallons
Weight	350 lbs.
Discharge/ Return Connections	½ NPT
Tank Fill	½ NPT
Tank Drain	3/8 NPT Ball Valve

STARTUP CHECKLIST

- **POWER SUPPLY**: Verify that the power supplying to the chiller matches the requirements as stated on the nameplate. Connecting chiller to the wrong power supply will damage system components and void the warranty.
- **FILL THE RESERVOIR**: Using the fill port on the top of the chiller to add water until the level reaches the red line marked on the sight glass.

  DO NOT USE DEIONIZED WATER!!
- **Connect Discharge and Return Piping**: Connect your piping to the two female fitting on the front of the chiller. Rubber Hose, PVC, and copper are acceptable piping materials. Do not use any ferrous piping material, as they will damage the chiller's water loop system. Doing so will cause damage to the chiller that is not covered by warranty.
- **Check for proper rotation**: (Not applicable for this model)



Models: **Micro Chiller**		**#MICRO0001R1**	Options:
Voltage: **230**	*Phase:* **1**	*Marks:*	**LOVE Electronic Controller**
Type: Air/Water Cooled Chiller			
Notes: All motors have internal overload protection unless otherwise shown On all connections: L1 - Blue L2 - Black L3- Red			
Schreiber Engineering 12111 Park St. Cerritos, CA 90703		(562)-926-3855 (562)-926-0969 Fax	

Schreiber Engineering – Air Cooled Water Chiller
Model MICRO MAX series

This unit is pre-wired for 230/1.

To test unit as follows. NOTE: Make sure the switch on the panel is at "OFF" position.

Connect the water system loop as follows. The discharge from chiller water pump to heat exchanger being cooled, then connect the return water to the chiller return as marked. These discharge and return fittings are 1/2" NPT. The connecting hose can be rubber or plastic. However, using rubber hose will require make adaptor at the chiller's discharge and return for connection. The pump is factory set to discharge water 4.4 gpm (gallon per minute) at 60psi. Adjusting the relief valve located at pump discharge can modify this flow condition. Be sure you use a non-contaminate hose.

Fill the reservoir through the fill pipe on top of the unit. Be sure you replace the cap when the reservoir's filled. The water sight glass is marked at the reservoir proper fill level.

The unit is equipped with a 220v female power plug. A male power plug is supplied with the unit. Proper wire connection is required with a certified electrical technician.

With input power, 220/1 voltages, supplied to the unit, the controller will display the discharge water temperature. Turning the main panel switch to "ON" position will starts the system. This switch activates the control to turn on the pump and the refrigeration system. The unit leaves the factory with discharge temperature setting at 60^0F. A 10-second delay is programmed to the controller to start the refrigeration unit. The minimum temperature is set 40^oF and the maximum temperature set is 90^0F. Refer to the control setting page for changing discharge temperature.

With the controller set at the proper temperature it will control this temperature within ±1° F.

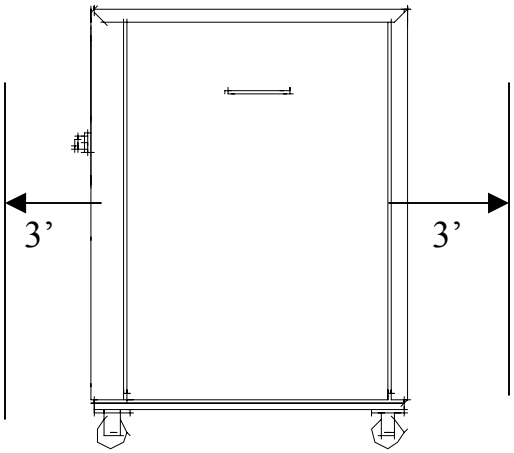
The unit is equipped with a low-pressure switch and high-pressure switch. These switches are inter-connected to the controller. These switches are there to protect the refrigeration system from leaking or overload. The low-pressure switch is set at 25 PSI and the high-pressure switch is set at 425 PSI. If any of the situations is occurring, the controller will automatically turn off the condensing unit. The controller will display "L1" or "H1", which indicate the refrigeration system is being shut off due to pressure.

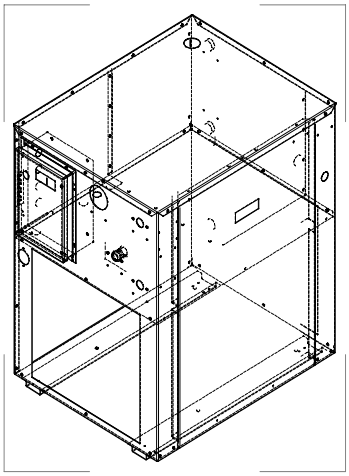
If the system is off at low pressure, display "L1", fix the leak and recharging the system will reset the switch. If the system is off at high pressure, correct the problem and press the red button to reset the switch.

A NOTE OF CAUTION: Always keep the fluid in the reservoir at its proper level. If the unit condenser becomes clogged it must be cleaned. Be sure you check the condenser often. Does not take much dirt in condenser to cause a problem.
The refrigeration system is a medium temperature. Never set the controller below 45°F.

INSTALLATION

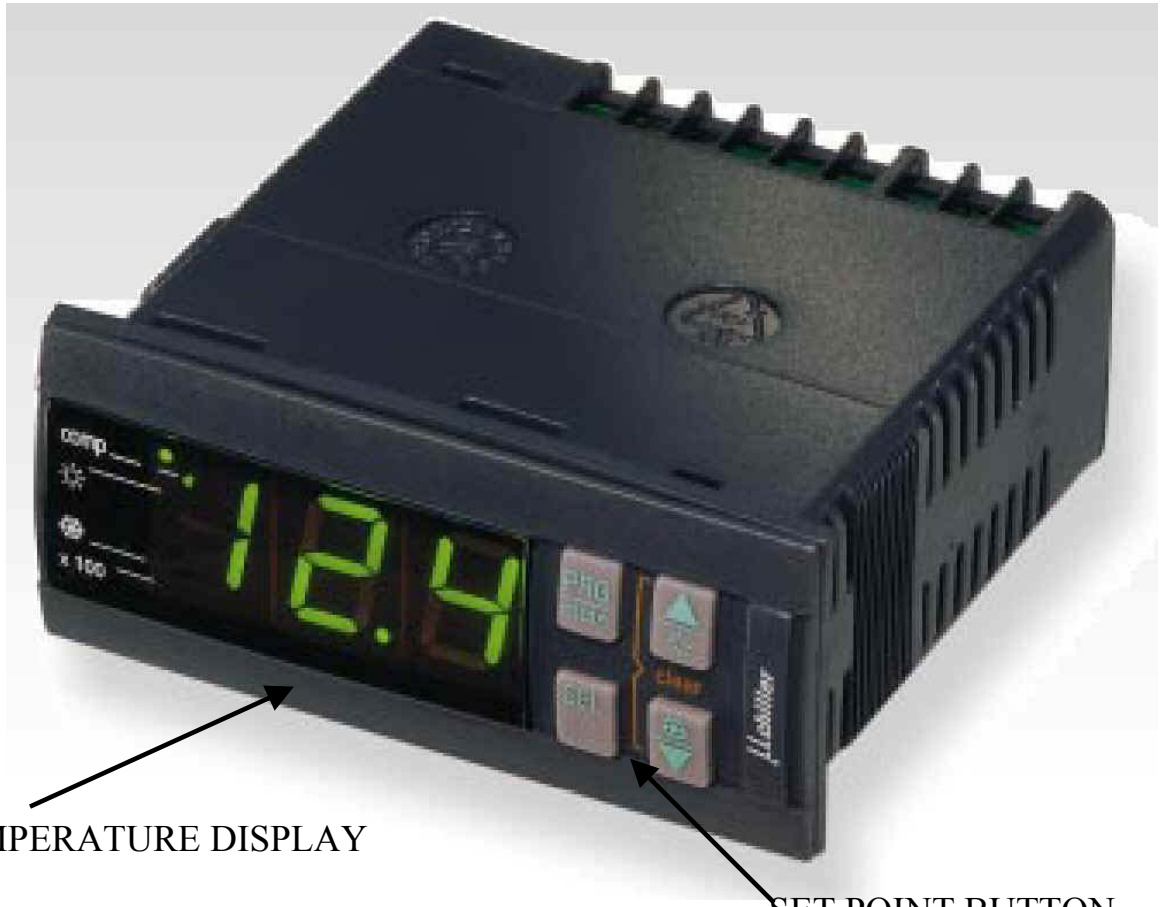
1. Place chiller on level ground.
2. Allow 3-in of clearance in the front and in the back of the unit. This clearance is necessary for air circulation through to the unit. If the airflow in and out of the chiller is restricted the chiller's cooling capacity is reduced.
3. Connect chiller to power supply. Refer to the nameplate for electrical circuit requirements.
4. Connect chilled water piping.
5. Fill tank with water to proper level at the fill port. Note the when the chiller is started the water level will drop slightly as the pipes are filled. Add more water after the unit is started.





OPERATION

1. After all electrical and plumbing connections are made, and the reservoir is filled, You are ready to start the unit.
2. Turn the main power switch to the "ON" position.
3. The temperature displayed is the chiller discharge temperature. Refer to controller page to modify the setting. Do not set the temperature less than 40°F. You will damage the unit.



INSIDE YOUR CHILLER

Electrical System:

- This chiller requires a power input of 220-volt single phase. The power supplier to the controller is 24 VAC through a step-down transformer. The chiller can operate at both 60Hz and 50Hz, however, there is a 12% reduction if cooling capacity, and a 17% reduction in flow capacity at 50 Hz
- High voltage electrical components stored in the control box. Take careful precaution when open the door. Door must be secure in place when the unit is operating.

CONTROLLER SETTING:

Parameters overview:

The Carel uchiller has many parameters available. Only a few will ever need to be adjusted.

Parameter	Function
R1	Cooling Set point
R2	Cooling Differential
R6	Return Temperature Reading

Changing Set points:

Cooling Set point:

1. Press the "SEL" key for 5 seconds. "R1" will appear on the screen.
2. Press the "SEL" key and adjust the desire cooling value. Press the "SEL" key to store the value.
3. Hit the "PRG" key to return to normal operation.

Refrigeration System

- The refrigeration system is factory charged with **R-134A**. If the refrigeration system has to be serviced and recharged with refrigerant, do not use any other than **R-134A**.
- The MICRO MAX series chiller is equipped with a refrigerant low-pressure and high-pressure refrigerant switches. The low-pressure switch is an automatic reset switch that will protect the compressor in the event of a refrigerant leak. It is set at 25-psi. The high-pressure switch is a manually resetting switch. The controller turns off the refrigeration unit when it detects a high-pressure condition in the refrigeration system. Chiller shut off at he refrigerant high pressure due to a dirty condenser, excessive ambient temperature, or a blockage in the refrigerant line. The high-pressure switch is set at 425-psi. Pressing the red button on the switch will reset the circuit.
- This is a medium temperature chiller. The temperature range is 45 to 90°F. The chiller will not operate to its full capacity outside of this temperature range.

Chilled Water System

- A 265 GPH (Gallons per Hour) positive displacement pump is equipped with this chiller. Because of its design, the flow rate is not adjustable. The pressure can be adjusted by throttling the discharge. If the discharge is throttled too much, the internal pressure relief valve will open and bypass water back through the tank. The pressure relief valve is factory set at 60-psi.
- The water used to fill the chiller must be absolutely free of any particulate matter. If any particles or sediment is run through the pump it will score the inside,

resulting in a marked decrease in pump performance. This failure is not covered by warranty. A filter is available as an option to install to the chiller. However the water initially placed in the reservoir must be clean.

- The reservoir level must be maintained to the level marked on the sight glass. Damage to the evaporator can result due to low water level.
- Plumbing must be rubber hose, PVC, or copper. Use of any other material will increase the chance of contamination in the chilled water system.
- The chilled water reservoir is not pressurized. Do not plumb two chillers in series.
- The MICRO MAX chiller is installed with a strainer on the return line to keep foreign particles out of the system.

SPECIAL FEATURES

SERVICE BULLETIN

HERMETIC COMPRESSOR ELECTRICAL TERMINAL VENTING CAN BE DANGEROUS

******

When the insulating material, which supports a hermetic compressor electrical terminal, suddenly disintegrates due to physical abuse or as a result of an electrical short between the terminal and the compressor housing, the terminal may be expelled, venting the vaporous and liquid contents of the compressor housing and system.

If the hermetic compressor terminal PROTECTIVE COVER is not properly in place with its weatherproofing gasket (if required) and bale strap fastening device secured, there is a remote possibility if a terminal vents, that the vaporous and liquid discharge can be ignited, spouting flames several feet, causing potentially severe or fatal injury to anyone in its path.

The discharge from a venting terminal can be ignited external to the compressor if the terminal PROTECTIVE COVER is not properly in place and if the discharge impinges on a sufficient heat source such as, but not limited to, an open flame, electric heater, or an electrical spark.

Ignition of the discharge can also occur at the venting terminal or inside the motor-compressor enclosure, if there is sufficient contaminant air present in the system and an electrical arc occurs as the terminal vents.

Ignition cannot occur at the venting terminal without the presence of contaminant air, and cannot occur externally from the venting terminal without the presence of an external ignition source.

It is, therefore, essential that any air in a refrigeration, air conditioning, or heat pump system be completely removed when the system is manufactured - when the system is installed - and whenever the system is field processed as a result of field service. Field service includes, but is not limited to, leak repairs or compressor replacement.

Eliminating air within the system prevents ignition at, or in, the hermetic compressor if a terminal should vent, thereby reducing the hazard potential.

To reduce the possibility of external ignition, all open flame, electrical power, and other heat sources should be extinguished or turned off prior to servicing a system.

Before using a soldering or welding torch to remove or repair tubing, make sure all the system refrigerant charge has safely been released.

A venting terminal presents no danger to servicing personnel or anyone else in the vicinity if the compressor terminal PROTECTIVE COVER is properly in place as shown

on Tecumseh Products Company drawings and diagrams using the parts as shown on Tecumseh Products Company bills of material.

Hermetic compressors can be properly serviced without unnecessarily removing the terminal PROTECTIVE COVER by adhering to the following service procedures:

1. If the branch circuit, short circuit, and ground fault protective device, i.e., fuse or circuit breaker, is open, this is a strong indication that an electrical problem exists and must be found and corrected.

   The circuit protective device rating must first be checked as required by the National Electrical Code, and its maximum rating should coincide with that marked on the equipment nameplate and/or on the unit wiring diagram and/or instructions. This breaker or fuse rating should be as low as practical. A rule of thumb is 175% times the motor-compressor RLA (FLA on older units) as shown on the unit nameplate.

   It is acceptable to first replace the fuse or reset the circuit breaker **ONE TIME** to determine if it was just a nuisance opening. **WARNING! The terminal PROTECTIVE COVER must be securely in place.**

2. If the fuse or circuit breaker again opens, DO NOT continue to replace or reset, as the equipment obviously has an electrical problem. CAUTION! Continual resetting may cause the terminal to vent.

3. DISCONNECT all power to the unit, making sure all power legs are open.

4. Without removing the terminal **PROTECTIVE COVER**, disconnect the three leads going to the compressor terminals at the nearest point to the compressor, and identify them as Common (C), Start (S), and Run (R). Identification can generally be made through the unit wiring diagram. DO NOT disconnect at the compressor terminals at this time.

5. With a Megger, Hi-Potential Ground Tester, or other suitable instruments which puts out a voltage between 300 and 1500 volts, check for a ground separately between each of the three C, S, & R leads and ground (such as an unpainted tube on the compressor). Do not use a low voltage output instrument such as a volt-ohmmeter or other such continuity instruments, as these will not detect a low level fault (ground).

6. If a ground is indicated, then carefully remove the compressor terminal **PROTECTIVE COVER** and inspect for loose leads or insulation breaks in the lead wires.

7. If #6 indicates no visible problem, carefully remove the leads at the compressor terminals. **CAUTION**: Damage can occur to the glass embedded terminals at this

point if the leads are not properly removed, which can result in the terminal venting and hot oil discharging. No ignition, however, can occur if all power is disconnected and no external ignition source is present.

8. Repeat #5 testing, carefully checking for ground, directly between each compressor terminal (C, S, & R) and ground.

9. If once again a ground is indicated, proceed to properly replace the compressor, as it has failed and cannot be repaired.

10. It is important to note that a volt-ohmmeter may be used only to check the resistance and/or continuity of the motor windings. This may be done as follows:
    (a) For internal overload protected motor-compressor, the overload is located between the common terminal of the compressor and the common motor lead inside the compressor.

        If the resistance reading between Common and Start or Common and Run is open (infinity) and the resistance reading between Start and Run indicates winding Resistance Values in the Tecumseh Hermetic Compressor Service Data Book, then the internal protector is open and time must be allowed for it to reset.

        Any Common and Start, Common and Run, and Start and Run resistance reading must be within the values shown in Tecumseh Hermetic Compressor Service Data Book.

        Three phase internal overloads open all three phases. Therefore, allow time for reset.

    (b) For external overload protected motor-compressors, the continuity of the overload may be checked. The resistance of all winding may also be checked, i.e., C-S, C-R, and S-R.

    (c) Any lack of continuity (other than test indicating an open internal protector) or improper resistance, indicates a faulty or damaged motor and the compressor must be properly replaced, as it has failed and cannot be repaired.

If the above indicates no problem with the compressor, then carefully reconnect the leads to the proper compressor terminals (C, S, & R), correctly replace the terminal PROTECTIVE COVER, gasket (if required), and the bale strap.

Then proceed to conduct similar ground and continuity test from the three lead connection points which you previously disconnected, forward toward the incoming power connections, to find the electrical problem. DO NOT reset the ground fault

protective device until you have located and corrected the problem. Refer to the Unit Wiring Diagram and Service Manual for the proper procedure and wiring checkout.

The text of step-by-step procedures uses language and symbols, which refer to the electrical supply as single phase. Three-phase equipment should be given equally cautious consideration when service is necessary.

Again, we want to stress that it is essential that WHENEVER ELECTRIC POWER is applied to the motor-compressor, the terminal PROTECTIVE COVER must be properly in place.

Servicing refrigeration and air conditioning systems can be dangerous, and extreme caution in all respects should be exercised by the personnel servicing such equipment.

The precautions discussed in this bulletin deal only with those dangers associated with VENTING TERMINALS.

MAINTENANCE INFORMATION

1. There are no lubrication points on the chiller. All motors have permanent lubrication in the bearings.

2. The water that is used in the chilled water circuit has no special requirements, except that **deionized water cannot** be used. The water should be clean and some type of water conditioner can be used. Nothing should be used in the chilled water circuit that could damage the all copper Heat Exchanger**. THIS INCLUDES THE USE OF DEIONIZED WATER.**

3. The air-cooled condenser should be cleaned on a regular basis; depending on the environment the chiller is installed in., check often.

4. The water level should be maintained as close to the level as marked on the water sight glass. You can damage the refrigeration system by the water being at a low level, and will affect the efficiency of the unit.

5. Caution: The compressor receivers and water pump could be hot enough to injure one touching these components.

6. The dial thermometer is reading the temperature of the discharge-chilled water.

7. **Please note:** This is a hermetically sealed compressor. There are no necessary maintenance requirements. **Please read the service bulletins before making any repairs.**

TROUBLE SHOOTING - PART I

SYMPTOM	DIAGNOSIS	REMEDY
Compressor won't run	Check Power supply Electrical circuit Check Line load voltage Temperature control Compressor overload Low pressure switch High pressure switch Manual switch Compressor All control circuit	 Correct circuit breaker Repair or replace bad circuit Correct voltage condition Repair or replace Replace Repair or replace Repair or replace Replace Replace Repair
Compressor runs No refrigeration	Refrigerant leak Stuck expansion valve	Repair leak and recharge Replace expansion valve
High pressure trips	Condenser motor Air over condenser restricted Service panel not in place	Repair or replace motor Clean condenser Install service panel
Low pressure switch Cutting out	Defective expansion valve Refrigerant leak	Replace expansion valve Repair leak
Temperature too high	Dial thermometer Temperature controller Water pump off	Re-adjust or replace Replace Check controls circuit
Temperature too cold	Temperature controller Dial thermometer Water pump	Repair or replace Out of adjustment Not circulating water

TROUBLE SHOOTING - PART II

REFRIGERATION SYSTEM INTERNAL PRESSURE USING REFRIGERANT R-134A

* High Pressure Switch : Manual Reset - Cut out at 425 P.S.I.
* Low Pressure Switch : Automatic Reset - Cut out at 15 P.S.I.

WORKING REFRIGERANT PRESSURES R-134A

* High Pressure : 185 to 325 P.S.I.
* Low Pressure : 45 to 70 P.S.I.

*****NOTE*****

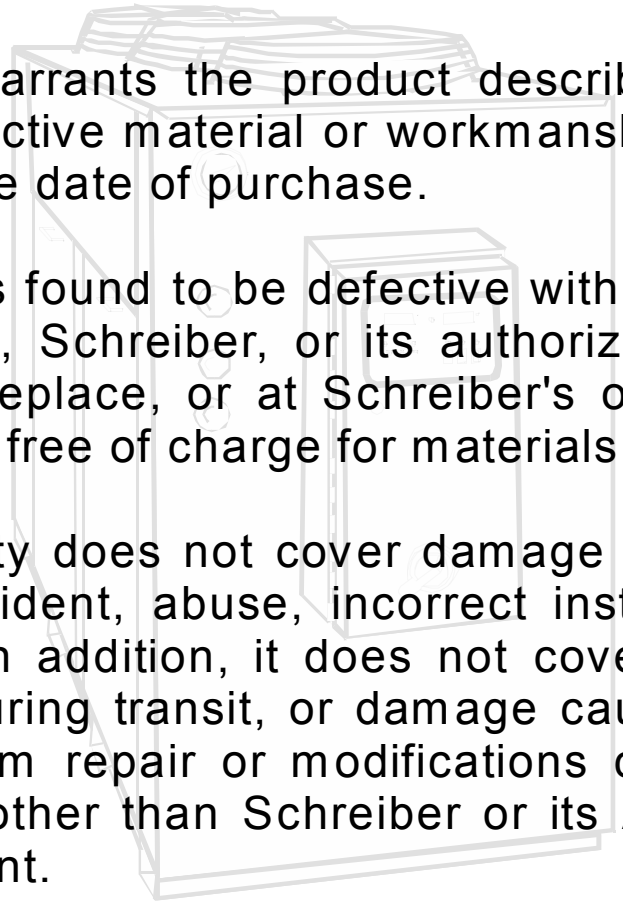
These pressures are under normal ambient temperatures and chilled water temperatures.

PARTS LIST
Micro Max Series - 230/1
If this unit has special feature(s) installed, see appendix for part number(s).

Part Number	Description		230/1	Qty.
Refrigeration				
R100C – cu	Condensing unit – MM50AC		✓	1
R102C – cu	Condensing Unit – MM100AC		✓	1
R114C – cu	Condensing Unit – MM150AC		✓	
R146 - .5	Refrigeration Sight Glass-1/4" for MM50AC			1
R146 – 1	Refrigeration Sight Glass-3/8" for MM100/150AC			1
R150	Drier ¼" for MM50AC			1
R152	Drier 3/8" for MM100/150AC			1
R140 - .5	Expansion Valve ¼" x 3/8" for MM50AC			1
R140 – 1	Expansion Valve 3/8" x ½" for MM100AC			1
R140 – 2	Expansion Valve 3/8" x ½" for MM150AC			1
R160-BP	Evaporator –Brazed Plate – MM50AC			1
R162-BP-C	Evaporator – Brazed plate – MM100/150AC			1
R184	High Pressure Switch – MM50AC only		✓	1
R185	Low Pressure Switch – MM50AC only		✓	1
Electrical				
E108	Contactors – 30 Amp- 240V coil		✓	1
E104	4 Point Terminal Block		✓	1
E109	Fuse Block – 30 Amp		✓	1
E109-F25	25 Amp Fuse			3
E109-F12	12 Amp Fuse		✓	3
E170 – 1	Relay Base		✓	1
E170	Relay 240v coil DP/DT		✓	1
E115	Grounding Screw		✓	1
E122	Switch		✓	1
E400	Love Control		✓	1
Plumbing				
P132	Pump assembly		✓	1
P132 – M	Pump Motor		✓	1
P132 – C	Clamp		✓	1
E136-30	Water Pressure Gauge			1
P146	Water Relief Valve			1
P149 - wsga	Water Level			1
Accessories				
C101	Casters		✓	4
CA100MM	Cabinet		✓	1
C100	Crate		✓	1

Note:
Some water connection parts are not listed

Schreiber Limited Warranty



Schreiber warrants the product described herein against defective material or workmanship for one year from the date of purchase.

If any part is found to be defective within the warranty period, Schreiber, or its authorized service agent, will replace, or at Schreiber's options, repair the part free of charge for materials and labor.

This warranty does not cover damage caused by misuse, accident, abuse, incorrect installation or operation. In addition, it does not cover damage occurring during transit, or damage caused by or resulting from repair or modifications carried out by anyone other than Schreiber or its Authorized Service Agent.

(562) 926-3855